



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/030,451	05/21/2002	Igor Vladimir Khudyakov	A7728	5676

23373 7590 07/19/2005
SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

EXAMINER

MARKHAM, WESLEY D

ART UNIT PAPER NUMBER

1762

DATE MAILED: 07/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/030,451	KHUDYAKOV ET AL.	
	Examiner	Art Unit	
	Wesley D. Markham	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 April 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21, 24 and 25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-21 and 25 is/are allowed.
- 6) ☒ Claim(s) 24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Acknowledgement is made of the amendment filed by the applicant on 4/29/2005, in which Claims 1, 7, and 12 were amended, Claims 22 and 23 were canceled, and Claims 24 and 25 were added. **Claims 1 – 21, 24, and 25** are currently pending in U.S. Application Serial No. 10/030,451, and an Office action on the merits follows.

Drawings

2. The replacement sheet of drawings (1 sheet showing a single figure) filed by the applicant on 4/22/2004 is acknowledged and approved by the examiner.

Claim Observations

3. Independent apparatus Claims 1 and 24 require, in part, “a beam expander for expanding an output of the laser source”. For the purposes of examination, the examiner notes that the aforementioned “beam expander” is not the same as and does not read on a so-called “beam splitter” which simply splits an incoming laser beam into two (or more) different outgoing laser beams and does not expand the beam. If the beam splitter also expands the diameter of the laser beam (i.e., as well as splitting the beam), it would qualify as a “beam expander”, as required by the claims. The point the examiner wishes to make is that splitting a laser beam, per-se,

Art Unit: 1762

into multiple beams, is not the same as and does not read on expanding the laser beam in the context of the instant application.

4. Regarding independent Claims 12 and 25, the preamble of each claim recites, "photocuring a coating on an optical fiber", while the body of the claim recites, in part, "focusing the expanded diameter laser beam...to cure the fiber". It is clear from the preamble of the claim, as well as the applicant's specification (see, for example, page 1, lines 2 – 5), that the step of "focusing the expanded diameter laser beam...to cure the fiber" recited in Claims 12 and 25 refers to curing the coating on the fiber (not the fiber itself), and the claims have been interpreted accordingly.
5. New Claim 24 requires that the laser source, the beam expander, the first lens, and the concave optical element be aligned in a linear disposition with each other. Similarly, new Claim 25 requires that the expanding, focusing, and reflecting elements each be aligned in a linear disposition with each other. These limitations are adequately supported by the originally filed specification (see, for example, Figure 1, which depicts the laser source, beam expander, first lens (focusing element), and concave optical element in a linear configuration).
6. Please note that the 35 U.S.C. 102 and 103 rejections based on Fejer et al., Kruishoop, and Osborne (see paragraphs 7 – 21 of the previous Office action) are withdrawn in light of the applicant's amendment to independent Claims 1 and 12 to require that the concave optical element comprises a half cylinder mirror (Claim 1), or that the step of reflecting the laser beam to the rear side of the fiber includes reflecting the laser beam with a half cylinder mirror (Claim 12). The use of such a

half cylinder mirror in the context of the apparatus and method claimed by the applicant is not taught or reasonably suggested by the aforementioned references.

Claim Objections

7. The objections to Claims 1, 7, and 12 set forth in paragraph 6 of the previous Office action (i.e., the non-final Office action mailed 1/31/2005) are withdrawn in light of the applicant's amendment to correct the informalities noted by the examiner.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claim 24 is rejected under 35 U.S.C. 102(b) as being anticipated by Hill (USPN 3,407,294).
10. Regarding **Claim 24**, Hill teaches an apparatus for redistributing laser light, the apparatus comprising (1) a laser source "1", (2) a scattering medium "20" comprising ground glass "21" and "22" which serves to expand the laser source output (i.e., a "beam expander") (see Figure 3), (3) a first lens "5" operable to focus the output of the beam expander into a column "23" of collected non-coherent light, and (4) a concave optical element "24" disposed after the beam expander and the first lens,

wherein the laser source, beam expander, first lens, and concave optical element are aligned in a linear disposition with each other (Figure 3, Col.2, lines 17 – 25 and 72, Col.3, lines 1 – 12). As the first lens “5” is operable to focus the output of the beam expander into a column “23” of collected non-coherent light, it is therefore also operable to focus the output of the beam expander on a coating disposed on a target fiber located in column of light “23” (i.e., between the first lens and the concave optical element), wherein the coating is response to a wavelength of light emitted from the laser source. Hill does not explicitly teach that the apparatus is “for photocuring a coating on a target fiber”, as recited in the preamble of Claim 24, or that the first lens is “operable to focus an output of the beam expander on the coating disposed on the target fiber, wherein the coating is responsive to a wavelength of light emitted from the laser source”. However, since the apparatus of Hill is clearly capable of focusing laser light on a fiber in the manner claimed by the applicant (e.g., the first lens is operable to focus an output of the beam expander on the target fiber) (see discussion above), the apparatus is also capable of photocuring a coating on a target fiber when the coating is response to a wavelength of the laser light. Therefore, the apparatus of Hill anticipates the apparatus of Claim 24. In other words, at the very least, the laser beam of Hill would be capable of slowly curing a coating on a fiber to a relatively low degree so long as the coating is sensitive to the wavelength of radiation emitted by the laser. Thus, the apparatus of Hill is capable of “photocuring a coating on a target fiber”. Please note that claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than

function, and a claim containing a recitation with respect to the manner in which a claimed apparatus is intended to be used does not differentiate the claimed apparatus from a prior art apparatus if the prior art apparatus teaches all the structural limitations of the claim (MPEP 2114). In this case, Hill teaches a laser source, a beam expander, a first lens operable to focus an output of the beam expander, and a concave optical element all aligned in a linear disposition with each other, thereby teaching all the structural limitations of Claim 24.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

13. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fejer et al. (USPN 4,650,322).

14. Fejer et al. teaches all the limitations of new **Claim 24** as set forth in paragraph 9 of the previous Office action (see the discussion of Claim 1), except for an apparatus in which the laser source, beam expander, first lens, and concave optical element are aligned in a linear disposition with each other. Specifically, Fejer et al. depicts the laser source "20", beam expander "22", and first lens "24" to be in a linear disposition, but concave optical element "28" to be offset by an angle θ (Figures 1, 2A, 2B; Col.2, lines 43 – 65). However, the overall purpose of concave optical element "28" (i.e., the doublet lens) is to receive and focus a refracted and reflected beam onto the photodiode array "32" (Col.2, lines 62 – 65). The calculations performed by Fejer et al. require that a scale factor "g" be taken into account, and Fejer et al. determines the scale factor "g" for a variety of angles θ , including $\theta = 0$ (i.e., the concave optical element is in a linear disposition with each of the other elements of the apparatus) (Figure 6, Col.2, line 34, Col.4, lines 56 – 57). Fejer et al. goes on to teach that the optimum value of θ depends on the given experimental situation (i.e., θ can approach large values in some situations, and θ can approach small values in some situations) (Col.6, lines 31 – 40). In other words, the value of θ is a result / effective variable that depends on the specific experimental conditions. Therefore, it would have been obvious to one of ordinary skill in the art to determine the value of θ as a result / effective variable through routine experimentation based on the experimental conditions chosen by the purveyor in the art and configure the

apparatus accordingly. Such an optimization would have reasonably been expected to include $\theta = 0$ (i.e., all the elements in a linear disposition with each other, as claimed by the applicant) because Fejer et al. is clearly interested in such a situation (Figure 6, Col.4, lines 56 – 57).

Response to Arguments

15. Applicant's arguments filed on 4/29/2005 have been fully considered but they are not persuasive.
16. Regarding Claim 24, the applicant argues that the concave optical element of Fejer is offset at an angle from the source and expander (i.e., the elements are not in a linear disposition with each other). This argument is not convincing for the reasons set forth in paragraph 14 above.

Allowable Subject Matter

17. Claims 1 – 21 and 25 are allowed.
18. The following is a statement of reasons for the indication of allowable subject matter:

Independent Claim 1 is drawn to an apparatus for photocuring a coating on a target fiber comprising a laser source, a beam expander, a first lens operable to focus the beam expander output on the target fiber coating, and a concave optical element disposed on an opposite side of the target fiber relative to the beam expander and first lens, wherein the concave optical element comprises a half cylinder mirror.

Independent Claims 12 and 25 are drawn to a method of photocuring a coating on

an optical fiber, comprising expanding a laser beam to produce an expanded diameter laser beam, focusing the expanded diameter laser beam to a strip of light having a diameter that is larger than the diameter of the fiber onto the front side of the fiber to cure the fiber coating, and reflecting the laser beam strip of light to a rear side of the fiber. Claim 12 further requires the use of a half cylinder mirror to reflect the laser beam, and Claim 25 further requires that the expanding, focusing, and reflecting elements be aligned in a linear disposition with each other. A summary of the closest prior art of record follows. Hill (USPN 3,407,294) and Fejer et al. (USPN 4,650,322) teach laser focusing apparatuses but do not teach or reasonably suggest (1) that the concave optical element is a half cylinder mirror (i.e., the concave optical elements of Hill and Fejer are lenses) or (2) a method of photocuring a coating on an optical fiber. Osborne teaches a method and apparatus for focusing a laser beam into a line to linearly weld sheets of polymeric material. The apparatus of Osborne does not include a concave optical element / half cylinder mirror, and Osborne does not teach a method of photocuring a coating on an optical fiber. Kruishoop teaches a method and apparatus for photocuring a coating on an optical fiber comprising a laser and a "plurality of lenses" for imaging the laser light source. However, Kruishoop, alone or in combination, does not teach or suggest (1) using a half cylinder mirror in conjunction with the laser curing / "plurality of lenses" embodiment or (2) that the expanding, focusing, and reflecting elements are each aligned in a linear disposition with each other. Thompson (USPN 6,463,872), Severijns et al. (USN 4,774,104), Byron et al. (USPN 5,995,697), and Sumitomo Electric (JP 64-

087536) all teach methods and apparatuses for photocuring a coating on an optical fiber. However, none of the references, alone or in combination, teaches or suggests each and every limitation of the claims. For example, Thompson does not teach or suggest expanding the laser beam (a beam expander) and focusing the expanded diameter laser beam to a strip of light having a diameter larger than the fiber diameter (a lens operable to focus the output of the beam expander on the target fiber coating); Severijns et al. teaches a mercury vapor discharge lamp (not a laser) and does not teach or suggest expanding the laser beam (a beam expander) and focusing the expanded diameter laser beam to a strip of light having a diameter larger than the fiber diameter (a lens operable to focus the output of the beam expander on the target fiber coating); Byron et al. does not teach or suggest expanding the laser beam (a beam expander), and Byron et al. teaches de-focusing the laser and using a concave mirror on the opposite side of the fiber to reflect light to the backside of the fiber (i.e., does not teach or suggest expanding the laser beam (a beam expander) and focusing the expanded diameter laser beam to a strip of light having a diameter larger than the fiber diameter (a lens operable to focus the output of the beam expander on the target fiber coating)); and Sumitomo Electric does not teach or suggest expanding the laser beam (a beam expander), focusing the expanded diameter laser beam to a strip of light having a diameter larger than the fiber diameter (a lens operable to focus the output of the beam expander on the target fiber coating), a half cylinder mirror concave optical element, or a linear.

Art Unit: 1762

disposition of the components. For the above reasons, independent Claims 1, 12, and 25 are allowed, as well as their associated dependent claims.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wesley D. Markham whose telephone number is (571) 272-1422. The examiner can normally be reached on Monday - Friday, 8:00 AM to 4:30 PM.

Art Unit: 1762

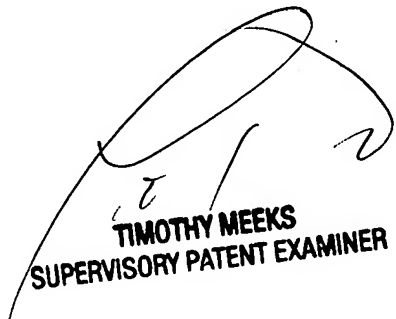
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tim Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



WDM

Wesley D Markham
Examiner
Art Unit 1762



TIMOTHY MEEKS
SUPERVISORY PATENT EXAMINER